1585

47-8-14

To: W. H. Ray

August 11, 1947

From: T. H. J. Burnett

In Re: Upsurge of Air Activity, July 22-23, 1947.

On Wednesday morning, 23 July, it was reported that there appeared to be high air activity at Building 735-B. This appeared to be verified from the Trafficounter tape data when brought in by R. D. Cameron, as the rise was more than that accompanying the usual inversion. Checking at 735-B, the count seemed normal, or even low which might indicate short half-lived material. The area background was around 4 mr/hr outdoors. A check of the filter paper then present on the tube with a Walkie-Squawkie showed no large noticeable contamination and the filter paper was not much soiled. Later it developed that R. L. Clark had changed the "hot" filter paper that morning. Its recovery was effected and a decay curve data count series was begun around noon. Using seven of the counts to date the following computations are made as though but one activity was present. Of the six values of λ found, the last four are rather close and a mean square average is computed. The formula used is

$$I = I_o \, e^{-\lambda t}.$$

Time of Count	t hours	no. of counts	$\frac{I}{I_o}$	λt	λ	$t_{\frac{1}{2}}$ hours	$t_{\frac{1}{2}}$ days
1230 23 July	0	1796					
0930 24 July	21	1570	0.875	0.133	.00633	110	4.6
0830 25 July	44	1470	0.819	0.200	.00454	153	6.4
0830 28 July	116	1262	0.703	0.353	.00304*	See average value below	
0830 29 July	140	1102	0.614	0.488	.00349*		
0830 30 July	164	1020	0.568	0.565	.00345*		
0830 31 July	188	958	0.534	0.627	.00333*		
mean square average last four values =					.00334*	208	8.7

The above computations would suggest a mixture of activities, a short-lived component similar to natural background and a sizeable quantity of a longer lived material, perhaps I^{131} with its 8.0 day activity.

[redacted]

To compute the concentration present we use the following formula which assumes 17% geometry, 5 cu.ft. per min. airflow and 100% collection:

$$\frac{\text{tape figure rise} \times 128 \text{ counting factor}}{\text{hours of rise} \times 60 \times .17 \times 2.2 \times 10^{6} \times 1.4 \times 10^{5}} = \mu c/cc \quad \text{or:}$$

$4.07 \times 10^{-11} \times$ tape figure rise per hour $= \mu c/cc$.

The significant tape figures for this episode are given herewith:

Time	Trafficounter Tape	Difference	
8 A.M. total	5715		
7 A.M. total	6596		
6 A.M. total	4789	1807	
5 A.M. total	979	3810	
4 A.M. total	928	5617	rise in 2 hours

Using 2809 average rise per hour from 5 A.M. to 7 A.M. we get an average concentration of 1.14×10^{-7} μc/cc which is 34% above the 8.5×10^{-9} tolerance value for I^{131}. However, a detailed study of 15 minute interval recordings show 1703 counts from 6 A.M. to 6:15 A.M. which represents 6812 counts per hour or 2.77×10^{-7} μc/cc, a value 3.26 times tolerance.

This again is felt to bear out the importance of this type of monitoring and to illustrate not only the need for adequate instrument service (monitors at 706-A and 115-B were out of order) but the value a network coverage of the plant area by such monitors with central recording and alarm notification would have both for protection and for localization of source. Checks made at Buildings 706-D, 706-C, and 706-A semiworks yielded no information of causative activities.

T. H. J. Burnett

THJB:ejp

cc: W. H. Ray
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C. File
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